

ATTACK AVIATION IN DISMOUNTED OPERATIONS

A Monograph
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Aviation



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ATTACK AVIATION IN DISMOUNTED OPERATIONS

by Major William G. Braun III, USA, 45 pages.

Abstract

This monograph answers the research question: *do published Army aviation doctrine, tactics, and techniques adequately address the infusion of attack aviation, on a conventional or unconventional low-intensity conflict battlefield, in support of light infantry in a direct fire engagement with a lightly armed dismounted enemy force?* To accomplish this task the paper focused on the use of attack aviation in a conventional close battle. The paper examines the adequacy of aviation doctrine against three criteria: does doctrine acknowledge the antipersonnel mission, are specific employment tactics and techniques addressed, and are the tactics and techniques sufficiently detailed to address the requirements of minimal planning, hasty attack missions in support of dismounted forces. The monograph concludes with a list of recommended tactics and techniques which should be added, as an interim measure, to unit tactical standing operation procedures to supplement current aviation doctrine. These tactics and techniques should be studied in more detail before adopting as official doctrine, as an objective measure.

Key words:

antipersonnel mission
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attack aviation hasty attack
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"911" mission

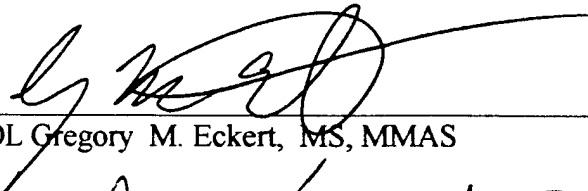
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Chapter 1: Introduction

Relevance

Since its emergence on the battlefields of Vietnam, the attack helicopter has had the mission to provide direct fire support to the infantry commander and provide escort security to infantry units conducting air mobile operations.¹ Near the end of the war in Vietnam, the anti-armor capabilities of the helicopter were discovered.² Since then, the anti-armor weapons, fire control systems, and doctrine for Army attack aviation have evolved to dominate aviation's role on the modern battlefield.

Army doctrine for conducting joint and combined deep strikes with aviation has been refined almost to the point of being a division level battle drill.³ Combined close operations doctrine is also adequately refined for the mechanized battlefield.⁴ The basic capabilities and planning considerations used to employ attack helicopter battalions (ATKHB), against armored and mechanized enemy forces, are available in doctrine. Division and maneuver brigade staffs are trained in the proper employment of ATKHBs, against mechanized threats, during combined arms training center rotations, and battle command training program simulations. So why is it necessary to explore the adequacy of aviation's anti-personnel doctrine, or the tactics and techniques used to implement it?

One important reason is because both Army, and aviation doctrine accept the validity of using Army aviation to influence the close battle. And, aviation doctrine acknowledges the antipersonnel operation as a valid mission. The field manual describing TTPs for the Attack Helicopter Battalion, FM 1-112, states: "Attack helicopter battalions ...provide the force commander a highly mobile and lethal

antiarmor, antipersonnel, antimaterial, air-to-air destruction capability both during the day and night.”⁵ The capstone aviation operations manual, FM 1-100 Army Aviation in Combat Operations, specifies attack helicopters will operate in anti-personnel roles.⁶

The same manual goes on to say that “During [low-intensity conflicts] LIC, attack aviation forces will mainly center on antipersonnel and aerial security operations.”⁷

While not the focus of this monograph, the Aviation Brigade manual, FM 1-111, also talks about using the ATKHB to provide antipersonnel fires in the division rear area fight.⁸ Basic Army doctrine addresses the rapid reaction capability inherent in the attack helicopter, and its ability to influence the battle when ground forces are decisively engaged.⁹

The inherent danger of the antipersonnel mission, in close proximity to friendly troops, is another reason for exploring the adequacy of aviation doctrine. An attack helicopter conducting a hasty attack against dismounts in close proximity to friendly troops, presents a significant risk to friendly forces, and arguably less certain results against enemy forces, than employment against enemy armor and mechanized formations. The issues of command, control, coordination, target detection and target identification, are more challenging in an engagement against dismounts than in an armored or mechanized engagement. The stand-off ranges between the opposing ground elements, technical limitations of aerial munitions and weapons, and delivery platform accuracy combine to increase the risk of fratricide and collateral damage.¹⁰ Additionally, if the terrain provides the enemy infantryman any advantage in cover or concealment,

munitions delivered by attack helicopters can not assure the destruction of the enemy force.

Our national military strategy (NMS) of engagement and enlargement suggests that LIC operations, and operations other-than-war (OOTW) - such as peacekeeping and peace-enforcement, may be more common.¹¹ The Army's FM 100-23, Peace Operations doctrine, notes "...attack helicopters, and observation/scout helicopters are important target acquisition, deterrent, and attack assets in peace operations."¹² As already noted, aviation doctrine also identifies the antipersonnel mission as one of the two most likely missions for attack aviation in the LIC environment.

Combat Training Center experiences, especially at the Joint Readiness Training Center (JRTC), which focuses on light infantry operations, indicate that employing attack aviation in support of light infantry in direct contact with dismounted enemy forces is a common practice.¹³ Recent operations in Granada, Panama, and Somalia confirm that the JRTC experience is not limited to the training centers, but practiced during actual operations.

During the October 1983 operation in Granada, URGENT FURY, "The U.S. Army component of JTF-120 was [composed] exclusively from light formations and special forces..."¹⁴ "Task Force 120, had a large complement of a diverse variety of helicopters,... Helicopters were the most visible element of Operation URGENT FURY and had, ...,a major role in providing fire support ..." ¹⁵

The 1989 operation in Panama, JUST CAUSE, also provided an opportunity for light infantry forces to employ attack aviation against a dismounted enemy. Most of the

aviation missions during operation JUST CAUSE were air assault security missions. The book, Operation Just Cause: The Storming of Panama, describes at least two instances where attack aviation provided suppressive fire missions designed to relieve pressure on ground maneuver forces. The first involved AH-64s (Apache) firing on the Comandancia, the second was an AH-1 (Cobra) engaging the guard barracks at Renacer Prison.¹⁶

Finally, when the humanitarian assistance operation, conducted in Somalia -1993, turned into a shooting operation, attack aviation fire support was used on several occasions to assist soldiers from the ranger regiment and 10th Mountain Division in their efforts to break contact with the enemy. In their book, Mogadishu! Heroism and Tragedy, Ken DeLong and Steven Tuckey relate stories describing hasty attack missions conducted by Army attack aviation to assist friendly infantry soldiers who were decisively engaged by enemy dismounts.¹⁷

The use of army aviation as a hasty attack force to support light infantry in direct contact with enemy infantry is becoming a common option in the field. In these situations the aviation officer is faced with the professional obligation, and cultural tradition, to support the dismounted soldier in trouble. The risks, rewards, and challenges associated with this practice have not been adequately explored by the combat arms community. This is partially true because the aviation community as a whole resists the antipersonnel mission in close proximity to friendly troops.

Wasted firepower may be an argument against the antipersonnel mission in traditional mid- to high-intensity combat. In that environment, the typical argument is

that the firepower inherent in the attack helicopter battalion must be preserved to defeat armor and mechanized formations. At the lower end of the conflict continuum, large formations of armor and mechanized forces are generally not part of the environment. In the OOTW environment, wasting attack helicopter firepower resources does not pose the same risk to the ground force commander as in mid- to high-intensity conflict. The risk shifts from the practical tactical concern of preserving an anti-armor capability, ensuring its availability when needed, to a doctrinal standard of conduct. That standard of conduct requires employing the force necessary to ensure victory, while limiting collateral damage, through a disciplined use of force.¹⁸

In summary, there are several reasons why examining Army aviation doctrine's adequacy, in addressing the use of attack helicopters in support of friendly infantry forces in direct contact with a dismounted enemy, is relevant. First, doctrine mandates the mission. Second, because of our NMS it seems likely we will continue to encounter the mission. Next, the mission is inherently more difficult, relative to fratricide, than an anti-armor mission. Finally, the Army's experience at combat training centers, and during recent operations, indicates the mission is conducted as a common practice. Combined operations between attack aviation and light infantry units require maneuver commanders to better understand inherent risks, capabilities, and limitations of attack aviation; and it requires developing aviation doctrine to accommodate the minimum planning hasty attack mission conducted against dismounted enemy forces in direct fire engagements with friendly troops.

Purpose

This monograph answers the research question: *Do published Army aviation doctrine, tactics, and techniques adequately address the use of attack aviation, on a conventional or unconventional low-intensity conflict battlefield, in support of light infantry in a direct fire engagement with a lightly armed dismounted enemy force?* To accomplish this task the paper focuses on the use of attack aviation in a conventional dismounted close battle. Attack aviation's employment in rear battle, and other non-linear dismounted engagements (such as a counter insurgency or peace keeping operation) are addressed by exception.

Method

The paper examines the adequacy of aviation doctrine against three criteria. First, does Army aviation doctrine acknowledge the legitimacy of employing attack aviation, against a dismounted threat, in support of light infantry. Second, do official Army aviation publications specifically address the employment tactics and techniques used by attack aviation against enemy dismounts in close proximity to friendly troops? Finally, do attack aviation tactics and techniques adequately detail the coordination requirements of minimal planning, hasty attack missions in support of dismounted friendly forces in direct fire range of enemy dismounted forces.

The second chapter, basic doctrinal review, examines in detail those portions of current Army aviation doctrine which impact the dismounted, direct fire, close combat operation. The Army aviation's capstone doctrinal manual, Army Aviation in Combat Operations, states that, "... attack missions are designed mostly for mid- to high-intensity

conflicts, they can easily be adapted to low-intensity conflict.”¹⁹ For this reason, the doctrinal review centers on attack aviation’s primary role of “defeat[ing] enemy armor, mechanized, and helicopter forces”²⁰ in a mid- to high-intensity conflict. The discussion of deep and rear battle operations is addressed in the context of background, comparison, or potential relevance to the main topic of dismounted, direct fire, close operations. The chapter ends with a discussion of the doctrinally accepted size of an attack aviation formation.

The third chapter, command and coordination, examines doctrinal command relationships associated with employing attack aviation in support of light infantry. This chapter emphasizes coordination required to conduct attack helicopter hasty attacks in close proximity to friendly dismounts. It highlights selected aspects of Army doctrine to determine their relevance to a combined aviation dismounted direct fire fight. Finally, the chapter examines branch specific doctrine (especially light infantry doctrine), and open source material, to assess the value of adding these concepts to Aviation doctrine.

The fourth chapter, accuracy and employment techniques, explores the capabilities and limitations of aviation weapons systems used to engage dismounted forces. The scope of this inquiry is limited to a gross assessment of weapon system capability and gunnery accuracy standards. It ends with an assessment of the risk factors those standards impose on a ground commander employing attack aviation in close proximity to dismounted friendly troops.

The monograph concludes with an assessment of Army aviation doctrine’s adequacy in addressing the employment of attack aviation as a hasty attack force, in

support of light infantry, in direct contact with a dismounted enemy. It recommends tactics and techniques which might be considered for application in unit tactical standard operating procedures (TSOP) and battle drills, or incorporated into official attack aviation publications. Incorporating these tactics and techniques into unit TSOPs would facilitate employing attack aviation on minimum planning, flexible response, antipersonnel, hasty attacks in support of friendly light infantry forces.

Definitions

Attack aviation, or attack aviation unit. In this monograph, attack aviation refers to any force which is primarily composed of attack helicopters. An attack aviation unit is one whose primary mission involves the employment of attack aviation. In current Army force structure these units include elements of: the Attack Helicopter Battalion (ATKHB), the Division Cavalry Squadron (Cav), the Armored Cavalry Regiment (ACR), and selected special operations aviation units. Many of the issues discussed in this monograph apply to special operations aviation. However, because of their unique missions and training, they are not specifically considered, or included in the generic term attack aviation, in this monograph.

Anti-personnel mission. Aviation doctrine uses the term anti-personnel mission to describe any mission in which Army aviation is used to engage enemy dismounted forces. This monograph refines this definition, limiting its use to attack aviation missions designed to engage a dismounted enemy in direct contact with a dismounted friendly unit.

'911' mission. A '911' mission is a non-doctrinal term used to describe a hasty attack, employing Army aviation attack helicopters, against dismounted enemy forces, in close proximity to (and usually conducting a direct fire engagement with) a friendly dismounted force. The mission is characterized by minimal, or no, prior coordination or planning. The '911' mission is particularly susceptible to fratricide and inappropriate employment of aviation forces.²¹

Chapter 2: Doctrinal Review

Introduction

This chapter addresses the specific antipersonnel missions found in aviation doctrine. It also provides the foundation necessary to examine the Army's ability to capture the essential tactics and techniques used to employ attack aviation against dismounted forces based on the close battle anti-armor missions described in doctrine. The chapter is divided into three sections. The first section examines the primary missions of attack aviation on the modern battlefield. It highlights attack aviation's strengths and weaknesses. And it sets the close battle antipersonnel mission in the context of attack aviation's overall role on the modern battlefield. The second section explores current concepts involving the use of attack aviation in deep and close operations. This section ends with an examination of the different characteristics inherent in emerging dismounted close operations, relative to the mechanized close fight. Specifically, the section develops the pathology of the '911' mission during predominantly dismounted low-intensity conflict or peace operations. The final section examines the doctrinal issue of attack aviation formation size, and the potential value of

employing attack aviation below battalion strength against dismounted targets in the low-intensity conflict environment.

Missions, strengths and weaknesses

Aviation doctrine asserts that it can operate effectively across the full spectrum of conflict. It can engage in deep, close, or rear battles. However, aviation doctrine and associated tactics and techniques are focused primarily on mid- to hi-intensity operations.

According to FM 1-100 Army Aviation in Combat Operations, “The primary mission of attack helicopters is to destroy enemy armored, mechanized, and helicopter forces.”²² The additional capabilities of attack helicopters to perform the roles of fire support and anti-personnel are acknowledged later.²³ But, these capabilities are neither elevated to the status of missions, nor developed later in FM 1-111 Aviation Brigade, or in FM 1-112 Tactics, Techniques, and Procedures for the Attack Helicopter Battalion, to provide detailed considerations for planning and execution.

Current Aviation Brigade doctrine also emphasizes that “Attack helicopter units are best suited for attacking moving enemy [mechanized] formations.”²⁴ The context of this statement stresses the need to employ aviation against massed lucrative targets, and to avoid stationary targets established in well fortified defensive positions. The armor/mechanized tactics, techniques, and procedures manual says,

During a hasty attack, attack helicopters have the speed and firepower necessary to shock and overwhelm the enemy and seize the initiative. Employed independently, the [attack helicopter battalion] is least effective when attacking strongly held, fortified defensive positions because of its lack of staying power and inability to hold terrain. It can, however, provide heavy and effective suppressive fires when attacking with ground maneuver forces.²⁵

Traditional Roles

For *deep operations*, army doctrine encourages using attack aviation in a set piece battle. The enemy is identified and tracked as it moves through a series of named areas of interest. An air or ground reconnaissance element confirms the technical surveillance and triggers a timed attack on the enemy force as it approaches an engagement area. The attack battalion is employed using the continuous attack, phased attack, or maximum destruction method. The method selected is primarily influenced by battlefield timing and enemy array. The Aviation Brigade manual, FM 1-111, dedicates a 40 page annex on deep operations to supplement the base document. The annex details the specific planning considerations for employing aviation in the deep battle.²⁶

During *close operations*, the attack helicopter battalion tactics, techniques, and procedures manual identifies three methods of employing aviation to gain and maintain the initiative: attack in depth to separate enemy echelons, mass to defeat enemy forces, and blunt enemy penetrations, and attack to defeat enemy flank attacks by dominating avenues of approach leading into the flank and rear of friendly ground forces, providing them security.²⁷ The tactics, techniques, and procedures for these methods are further refined in relation to anti-armor formations.

Speaking again in the context of a mechanized fight, Army doctrine, in FM 7-20 The Infantry Battalion (Infantry, Airborne, and Air Assault), encourages using aviation's anti-armor capability to "provide quick and violent assistance to the [dismounted infantry] battalion disengaging from the enemy", or to "respond quickly to protect flanks and seal gaps."²⁸ Infantry doctrine does not specifically mention the use of aviation to

assist in the disengagement, or flank protection of a friendly dismounted infantry force against a dismounted enemy force.

The Aviation Brigade manual, FM 1-111 Aviation Brigade, does acknowledge that attack aviation objectives encompass the antipersonnel mission.²⁹ In a brief eight page annex on low-intensity conflict, it further mentions the use of attack aviation as a flexible response force to be used against dispersed threats. In addition, Aviation's capstone operations manual, FM 1-100, identifies supporting fires for ground maneuver forces and antipersonnel operations as capabilities of attack aviation.

The attack helicopter battalion tactics, techniques, and procedures manual, FM 1-112, acknowledges the dominance of the antipersonnel mission during low-intensity conflict operations when it says, attack helicopter "battalion aircraft [basic and combat loads] will be oriented toward antipersonnel and antimaterial."³⁰ But it goes on to say "the attack helicopter battalion remains the light division's best antiarmor force and must be prepared to shift rapidly to the antiarmor mission."³¹ When describing options for employing attack helicopter battalions in close combat, FM 1-112 identifies "reinforcing ground forces by fire, [and] attacking ...light forces" among the ground force commander's options.³² The attack helicopter battalion manual does not, however, contain a section describing specific considerations for planning or conducting the antipersonnel mission.

Thus, aviation doctrine does convey the impression that the antipersonnel mission is an accepted capability, and legitimate mission for attack aviation. It also, however, communicates the aviation community's position that the antipersonnel mission is

secondary to attack aviation's primary mission, the destruction of massed mechanized forces. Nevertheless, this section reveals a deficiency of specific tactics or techniques in aviation manuals to address the antipersonnel mission. The absence of specific tactics or techniques, implies that aviation doctrine assumes attack aviation can perform many of the close battle functions against dismount forces, using only slightly modified methods, that it uses against mechanized forces.

Emerging Roles

This section examines the subtleties of employing attack aviation as a response force. It compares the differences between using attack aviation as a hasty attack force, which is integrated into the ground scheme of maneuver, and using attack aviation as a reaction force, to provide supporting fires to units in contact as a result of an unforecast meeting engagement. The section ends with an examination of attack aviation's role in low-intensity conflict operations.

In the close battle, aviation provides the ground commander with an immediate counter attack response force. Aviation "exploits uncovered weaknesses and compensates for any friendly failures that occur in the division's close area of operations."³³

During a Battle Command Training Program seminar, presented to the students of the School of Advanced Military Science the week of 21 - 25 March 1996, the senior controller, GEN (Ret.) Richard Cavasos, observed: "The surprise of a meeting engagement is not a preferred method of enjoining combat". In spite of this astute observation, history is replete with examples of meeting engagements in warfare. When

a friendly infantry force's momentum is stopped or their ability to maneuver is impaired, as a result of a meeting engagement, aviation can "contribute supporting fires at surface targets."³⁴ This application of fires is designed to sustain the tactical force in contact. The rapid reaction time and relative firepower inherent in attack aviation can provide a ground maneuver unit excellent support during meeting engagements.³⁵

Employing aviation as a rapid response force usually results in a hasty attack mission. The hasty attack is an offensive operation designed to seize or retain the initiative over the enemy. In mid-to high- intensity conflict, it usually evolves from a movement to contact or proceeds from successful defensive operations.³⁶ During rear area operations, counter insurgency operations, or operations other than war contingencies, the hasty attack may result from a need for violent, aggressive action which must be executed in minimal time.

As with the mid- to high- intensity conflict, the meeting engagement has relevance in low-intensity conflict. In the low-intensity conflict, attack aviation may be integrated into a ground commander's scheme of maneuver as a counter attack force. In addition to this integrated counter attack role, both Army and aviation doctrine discuss using attack aviation as a rapid response force. This is particularly apparent in low-intensity conflict operations.

Aviation's capstone doctrinal manual, FM 1-100 Aviation in Combat Operations, states low-intensity conflict remains the most likely form of future combat.³⁷ Low-intensity conflict operations have been characterized, in FM 100-20 Military Operations in Low-Intensity Conflict, FM 100-23 Peace Operations, and recent operations in

Somalia, Bosnia, and Haiti, by the employment of special operations, military police, engineer, transportation, and a variety of combat support units operating across great expanses of terrain. Often, the peaceful nature of the missions are tenuous. As the Army engages in more politically sensitive peace operations and operations other than war, aviation can offer the ground commander some flexibility.

If the peaceful nature of the mission is tenuous, an aviation brigade operating out of a secure base of operation can be a tremendous asset to the land force commander. Army aviation can provide an effective response throughout the area of operation. The aviation brigade's combat assault battalion can provide dispersed ground units with a rapid increase in combat power in the form of a dismounted infantry force air assaulted to an enemies flank or rear. The aviation brigade's attack helicopter battalion or divisional cavalry squadron can provide direct and indirect fire support to the engaged force. In the low-intensity spectrum, "Army aviation may be the commander's best reconnaissance and surveillance capability, greatest fire power asset, and greatest source of mobility."³⁸ In the low-intensity conflict, or during operations other than war aviation will primarily perform reconnaissance and security missions.³⁹

When discussing aviation employment in operations other than war, the aviation brigade operations manual says, "In those exceptional circumstances when US forces may be directly involved in combat operations, the mobility and firepower of aviation help solve the dilemma of protecting all the targets that the insurgent may choose to attack. Its rapid reaction capability permits the distribution of ground forces in widely separated small groups. Aviation can provide the necessary reaction force to defend such

groups should they be attacked.”⁴⁰ There is a growing trend to use army aviation as a flexible response option in support of these widely separated dismounted forces.⁴¹ This is a logical trend considering the mobile and responsive firepower aviation can bring to bear across the breath and depth of the area of operation. Aviation’s mobility affords the senior commander a rapid combat power response to provide direct fire support to the dispersed cells.⁴²

When employing attack aviation as a counter attack force in the close battle, or a rapid response force in the low-intensity conflict environment the attack aviation force is conducting a hasty attack mission. The primary difference between the two missions centers on the planning and coordination time available prior to execution, and attack aviation’s integration into a ground force commander’s scheme of maneuver. According to Army aviation doctrine, hasty attacks are usually integrated into a larger ground scheme of maneuver.⁴³ The ground maneuver and attack aviation leaders may not know the exact time, engagement area, and threat to be encountered, until shortly before the mission. To compensate for this ambiguity, ground and air units coordinate multiple engagement areas, battle positions, and control measures which are likely to be used.⁴⁴

These preplanned and coordinated contingency measures are often lacking in rear area operations, unanticipated meeting engagements during low-intensity conflict, and operations other than war contingency environments. The senior aviation observer at the Joint National Training Center, COL Davis D. Tindoll, observed “Because of the urgency of the situation, aviation and infantry units often execute hasty attacks after having been afforded only minutes to plan and coordinate.”⁴⁵ Aviation doctrine asserts,

“...spur-of-the-moment or improvised employment of aviation assets permits neither effective synchronization of ground and air activities nor effective planning to fit aerial maneuver to the terrain.”⁴⁶

There is a discrepancy in aviation doctrine regarding the legitimacy of employing aviation on a “911 mission”. The discrepancy is particularly evident if the aviation unit is acting as a reserve. The Aviation Brigade manual sanctions using aviation units to compensate for unanticipated friendly failures in the division’s close area of operations.⁴⁷ The tactics, techniques, and procedures for the attack helicopter battalion manual states: “An attack helicopter battalion should not be held in reserve [as a counter attack force] to redeem failure.”⁴⁸ Regardless of the doctrinal correctness of the “911 mission”, experience at Combat Training Center, Battle Command Training Programs, and recent deployments indicate “911 missions” are a common practice,⁴⁹ and should therefore be specifically dealt with in aviation doctrine.

Formation Size Employment considerations

There is another basic doctrinal consideration which distinguishes the mechanized mid- to high-intensity close battle from its dismounted low-intensity counterpart: the size of the attack aviation force to commit to the mission. To conduct an effective counterattack, aviation doctrine recommends employing aviation in “large numbers to ensure fire superiority over the enemy at the critical point in the battle.”⁵⁰ Aviation doctrine also discourages the employment of aviation in formations smaller than battalion size.⁵¹

Aviation doctrine also encourages the force commander to focus aviation against high payoff enemy targets and other high-priority threats when writing his intent and concept of the operation.⁵² Aviation capstone doctrine implies that these high payoff targets, and high-priority threats are generally massed enemy formations on the move. While this may be true in the mid- to high-intensity conflict, it may not be true in low-intensity conflict when the threat may be primarily made up of dismounted forces. A theater specific intelligence preparation of the battlefield could identify a dismounted infantry platoon threatening the division's logistics base as a high-priority threat in a mid- to high intensity conflict rear area operation. Similarly, a well armed dismounted squad may be considered a high-priority threat in an operation other than war contingency. This is especially true if the friendly forces being engaged were not combat elements. The relative combat power necessary to defeat a dismounted enemy infantry force, particularly in a low-intensity conflict or rear area operation, will not likely require the same force necessary to destroy a massed enemy mechanized formation.

Current aviation doctrine does not recognize this possibility. Aviation doctrine contends, "The ability of commanders to capitalize on the dynamics of combat power will be determined by their skill in managing risk effectively; for example, balancing mission benefits with the likely risk cost."⁵³ Yet, attack aviation tactics and techniques do not allow for the employment of an attack helicopter force below battalion level.

This section reviewed basic aviation doctrine to establish the traditional role of attack aviation on the modern battlefield. Further, it examined currently accepted methods for employing attack aviation in the close battle. The section ends with a

comparison of attack aviation's use as an integrated counter attack force, and the emerging acceptance of using attack aviation as a suppressive fire response force. The emerging employment tactic is gaining popular recognition as a '911' mission. This examination provides the foundational framework necessary to examine command and coordination requirements to effect the employment of attack aviation in support of light infantry forces.

Chapter 3: Command and Coordination

This chapter highlights command relationships, and coordination themes associated with employing attack aviation in the close battle, in support of dismounted friendly forces in close proximity to the enemy. It provides a foundation to assess the adequacy of published aviation doctrine, tactics, and techniques to facilitate the use of attack aviation in support of a light infantry force conducting a direct fire engagement with a dismounted enemy force. The first section describes the preferred method of using the operational command relationship, in aviation doctrine, when conducting close battle operations. The importance of this command relationship is that it places the command and control responsibility of the close fight with the ground commander. The second section addresses the need for coordination between air and ground units. It further identifies several critical elements which should be coordinated, and suggests there is a time constraint to effect the integration of attack aviation into a ground scheme of maneuver. The final section of the chapter points out the need for liaison. Liaison between the attack helicopter force, and the unit in contact, facilitates coordination, and

mitigates the impact of limited planning time. This liaison section defines not only the need for liaison, but the echelon of command at which liaison should be done.

OPCON

Aviation's capstone operations manual begins with the notion, "To win on the modern battlefield, the control and use of air and ground elements will be inextricably linked."⁵⁴ One of the fundamental concerns of commanders, when conducting close combat operations where air and ground forces are employed in close proximity, is: 'who owns the fight'? The answer to this fundamental question can be found in the command relationship established between the two units by their next higher commander. Aviation doctrine recognizes the command relationships of assigned, attached, and operational control (OPCON) as valid methods of establishing unit linkages. Aviation doctrine's singular focus on the OPCON relationship, when allocating attack aviation forces for close battle engagement missions, suggests that the aviation community agrees with Philip Taber, an Air Force pilot who wrote an article in the Aviation Digest on night close air support, when he says, "In a troops-in-contact situation, the decision to employ ordnance ... would still fall to the Army ground commander."

"Aviation attack and reconnaissance assets normally use the command relationship of operational control [OPCON] for combat and maneuver operations."⁵⁵ As a rule, an OPCON unit is controlled by a headquarters of a higher echelon command. This means the OPCON relationship is generally established between an aviation force, and a ground force headquarters superior to the unit engaged. This is particularly true of

a '911' mission scenario, where unexpected enemy contact is made with a relatively small element of a larger friendly force conducting a meeting engagement.

The aviation brigade manual identifies the similarity of employing aviation assets and ground maneuver forces, while recognizing the subtle differences required to accommodate aviation's unique capabilities.⁵⁶ When the counter attack is conducted by an attack helicopter force, aviation doctrine places restrictions on the ground force commander's OPCON authority. To capitalize on their agility, aviation units require an increase in the overall need for dynamic, effective, and flexible C2, coordination, and liaison.⁵⁷ Because of aviation's unique capabilities and limitations, aviation doctrine places restrictions on the gaining ground force commander's OPCON authority, relative to a similarly task organized ground maneuver force.

"Aviation forces are not normally placed under OPCON [of a ground maneuver unit] below brigade level, except in special circumstances."⁵⁸ In addition, aviation maneuver forces are *always* employed as a battalion-size force.⁵⁹ The explanation for this doctrinal restriction is "Attack helicopter companies do not have the resources to recycle elements for sustained engagements between the FARP [Forward Area Rearm and Refuel Point] and the area of operations."⁶⁰ Aviation doctrine does not modify this position for low-intensity conflict. "In low-intensity conflicts, the ATKHB will be task-organized more with other aviation assets and be used less in mass. However, it remains a maneuver unit, and operates as a battalion."⁶¹

The OPCON relationship provides the gaining commander the authority "to direct forces assigned so that the commander may accomplish specific missions or tasks

that are usually limited by function, time, or location, to deploy units concerned , and to retain or assign tactical control of those units. It does not of itself include administrative or logistic control.”⁶² According to joint doctrine “Operational control normally provides full authority to organize commands and forces and to employ those forces as the commander in operational control considers necessary to accomplish assigned missions.”⁶³

Relative to these specified authorities, aviation doctrine further limits the gaining commander’s authority. Aviation doctrine is explicit regarding the sovereignty of the aviation battalion commander over his companies, and dogmatic about committing aviation forces under the OPCON of a maneuver unit in less than battalion strength. It states: “The gaining force commander does not have the authority to task-organize the components of attack helicopter battalions... nor does he have the authority to assign missions or separate employment tasks to company/troop-size components of the battalion...”⁶⁴

Aviation doctrine’s restrictions on OPCON relationships are intended to maximize the effectiveness of the attack aviation force by accounting for their unique characteristics, and increasing the probability of their massed employment. The restrictions limit the ground commander’s flexibility to integrate attack aviation into the ground scheme of maneuver, without detailed coordination. Most importantly, however, it does afford the ground commander in contact with the enemy, ultimate authority to control the fires employed by attack aviation against an enemy in close proximity to friendly forces.

Army doctrine points out that aviation units are maneuver units⁶⁵ and care must be taken not to treat them as fire support or close air support units.⁶⁶ The primary antipersonnel weapons system used by attack aviation to engage a dismounted enemy is the 2.75 inch rocket. It can be fired in either the direct and indirect mode. Because of this, and the limitations placed on the OPCON relationship by aviation doctrine, some commanders may consider a support relationship a more appropriate mechanism to link attack aviation with a ground force.

Employing attack aviation as a fire support platform has both political and practical implications. The political consideration involves analyzing the roles and missions delineating Army and Air Force aviation responsibilities. The practical concern involves the different tactics and techniques available to employ and control a fire support force and a maneuver force. An analysis of these political and practical concerns fall outside the scope of this monograph. However, the conclusion suggests that tactics and techniques appropriate to support relationships, particularly those used by the fire support community conducting danger close missions, should be studied in more detail to determine their utility to attack aviation.

Coordination and planning

This section addresses coordination requirements between attack aviation forces and the light infantry forces they are supporting, in a dismounted close battle engagement. The section emphasizes a minimal planning '911' mission scenario. In the scenario, the attack helicopter's combat power is used to disrupt a dismounted enemy's attack, allowing the friendly ground force to disengage and displace. The section starts

with a brief survey highlighting coordination requirements, at different echelons of command, necessary to effect an unplanned hasty attack. This discussion progresses to a more detailed consideration of the final coordination necessary to effect target hand-over between a ground force in contact, and an attack aviation counter-attack force. The section ends by considering the increased risk imposed on the operation when coordination time is constrained by the urgency of the mission, and the ability of a liaison to mitigate that time constraint limitation.

When employing attack aviation forces OPCON to a ground maneuver commander, there are generally four distinct coordination relationships established at three echelons of command. The first relationship links the attack aviation task force and the ground maneuver brigade. The infantry battalion and attack team establish the next coordination relationship. The third and fourth coordination relationships are established at the same echelon of command. The two way coordination between the ground element in contact, and the attack helicopter element responsible for the engagement, constitute the third and fourth coordinating relationships.⁶⁷

The ground commander, at the echelon of command receiving the attack aviation force (usually the brigade), must provide the attack aviation unit the initial information required to get them from their assembly areas to a holding area in the supported units sector.⁶⁸ This information should include, at a minimum, ingress and egress routes, call-signs and frequencies, single channel ground to air radio (SINCGARS) time hack, holding area location, and the coordinates of the objective area.⁶⁹ The holding area should be within tactical frequency modulation (FM) radio range of the unit in contact, to

facilitate final coordination. If planning and coordination prior to the attack is expected to last more than 15 minutes, the brigade should designate alternate holding areas.⁷⁰

At the ground battalion/task force level, the attack team commander must get the most current enemy and friendly situation update. Because of their maneuverability, it is likely the attack aviation unit will require coordination to facilitate its maneuver and fires across several company or battalion boundaries. The battalion is the last echelon of command with a staff capable of effecting that support coordination.

Fire Support Coordination Measures

Permissive Measures

- Coordinated Fire Line
- Fire Support Coordination Line
- Free-fire Area

Restrictive Measures

- Restrictive Fire Line
- Restrictive Fire Area
- No-Fire Area
- Formal and Informal airspace coordination areas

Note: Recommended fire support measures for attack helicopter operations.

FM 1-112, Table 5-1

The battalion

commander is also responsible for developing the basic scheme of maneuver, and associated control measures for employing the attack aviation assets provided to him. Army doctrine states, "The difficulty

in the hasty attack is massing direct fires at the right place and right time. The task force commander must prepare complete and accurate graphic control measures that support direct fire. He must war-game how to position his forces quickly to gain the advantage from terrain in a limited amount of time."⁷¹

At the infantry battalion, "Fire distribution guidelines, fire support priorities, and coordination of movement and fires across unit boundaries should be emphasized and coordinated."⁷² The battalion should also verify call-signs and frequencies of the unit

engaged.⁷³ Philip Taber recommends several other planning factors, for night close air support, which have applicability to the attack helicopter fight. The battalion can provide suppressive fires on enemy air defense systems with internal mortar assets, or direct support artillery. At night, particularly for AH-1 employment, these fire support assets can also provide illumination of the target to aid in detection and engagement.⁷⁴ Laser designation capability, laser codes, friendly air defense weapons control status, and airspace coordination with Air Force close air support are some additional planning factors recommended by Air Force Instruction 13-106, which can be coordinated by a battalion staff.⁷⁵

The final echelon of coordination is conducted between the ground and air elements directing the immediate engagement. Typically, this final coordination “...begins with the infantry company commander and *ends with the leader of the lowest-level unit in contact.*” (italics added)⁷⁶ The attack aviation leader responsible for directing the immediate engagement depends largely on the size of the attack aviation force employed. When responding to ‘911’ mission requests, against small dismounted formations, the attack aviation response force could be as small as a single scout-weapons team. The critical point remains, “...when an attack team is committed to execute a hasty attack, mission success requires detailed coordination between the attack team and the infantry unit already engaged in close combat.”⁷⁷

The attack helicopter force leader should provide the leader in contact with information he needs to assess the capabilities and limitations of the force he must integrate into the ground scheme of maneuver. Davis D. Tindoll’s article suggests the

attack helicopter force's location, composition, weapons configuration, and armament load are among the most pertinent. Other information, that could bear on the tactical situation, might include: the length of time the force has the ability to remain on station, night vision capabilities, and available target acquisition systems which may influence target designation techniques.⁷⁸

The communication between the leader of the force in contact to the leader of the attack helicopter force responsible for the engagement is equally important. Generally, information available at higher headquarters is stale and imprecise, when compared to the immediate and detailed information available from the element in contact. Therefore, the information the ground force leader provides back to the attack aviation force is vital to a successful mission. The leader of the unit in contact must provide a detailed description of the current enemy and friendly situation. The Tindoll article suggests that this description must include the ground commander's mission statement, concept of maneuver, method of marking friendly and enemy positions, and a detailed description of the target and its location. Tindoll further recommends that, "Only upon completion of the coordination with the lowest unit in contact does the flight depart the holding area for the battle position."⁷⁹

The final coordination step required to complete the attack aviation engagement is the target-hand-over between the ground element and the attack aviation element. John Magness, in an article dealing with attack aviation employment in the rear area, acknowledges a variety of control measures which can be implemented to prevent fratricide. He concludes that the most critical control measure is to "...allow the ground

commander to guide the aircraft onto the target.”⁸⁰ Attack aviation publications agree with his assessment. The attack helicopter battalion tactics manual suggests, “...target handovers [to attack aviation] should be made by friendly forces in contact with the enemy.”⁸¹ The target handover information exchange is expedited, for the attack helicopters in battle positions, by the coordination described earlier between the ground unit in contact and the attack aviation unit in the holding area. The actual target handover does not occur, however, until the attack helicopter weapons team is in a battle position and can positively identify the target.

As was discussed in the introduction, “...at the JRTC--in operations other than war scenarios--infantry and aviation units often close with the enemy in unpredictable situations. Planning and coordination are often minimal.”⁸² This time constraint does not negate the requirements for the detailed coordination just examined. “Although aviators are frequently at a readiness condition status that facilitates quick reaction, this measure is not enough [to ensure adequate coordination and planning].”⁸³ Capstone aviation doctrine points out, “...while Army aviation can execute rapidly, the planning time required is similar to that of any equivalent level of command.”⁸⁴

Liaison

To minimize the impact the time constraint imposes on the successful execution of the hasty attack “Commanders must ensure that coordination between aviation and ground units is continuous and detailed. This coordination precludes any possibility of being misunderstood or becoming disconnected during battle.”⁸⁵ One method of achieving this detailed coordination is through liaison. When liaison with supported

units is required, “aviation commanders are the most effective liaison officers,...”⁸⁶ Not only are aviation commanders the most effective liaison officers, current aviation force structure does not provide for dedicated liaison to fulfill the doctrinal supporting to supported relationship. For these reasons, when the overall concept of the operation makes the use of attack aviation in support of a light infantry unit likely, a prudent attack aviation task force commander must consider committing his company commanders to the liaison role.

Chapter 4: Accuracy and Employment Techniques

Introduction

This chapter explores the impact of several variables on the ability of attack aviation to conduct engagements against dismounted targets, in support of an engaged light infantry force. The chapter examines attack helicopter accuracy standards, as a function of helicopter gunnery scoring criteria, and the impact of antipersonnel weapons systems on the ground commander’s risk assessment prior to committing attack aviation to the engagement. The intent of this chapter, is not to offer a definitive solution to the risk assessment challenge. Rather, the chapter explores the impact of several variables affecting the employment of attack aviation in the antipersonnel mission. The chapter concludes with an assessment of how well published aviation tactics and techniques, address these employment variables, as they relate to an antipersonnel hasty attack in close proximity to light infantry forces.

In an Aviation digest article, published in September 1994, Philip P. Taber suggests a construct for a common set of variables. He suggests the assessment of

“...minimum safe distances should be based on aircraft capabilities, type of target mark, attack geometry, and ordnance fragmentation patterns.”⁸⁷ Drawing on this construct, the chapter addresses system accuracy (aircraft capabilities), ordnance options (fragmentation patterns), and detection, acquisition, and identification (target marking) considerations. The sections on ordnance options and identification also consider possible tactics and techniques (attack geometry) which might increase the potential for enemy forces destruction while minimizing the threat to friendly forces involved in the engagement.

Before continuing with the chapter, it is important to examine some terminology used in aviation doctrine. The terms quantify what an attack aviation unit is trying to accomplish when supporting a ground force commander. The hasty attack and the supporting fire missions were identified, in the second chapter, as the two most common employment tasks of attack aviation on the dismounted battlefield. When conducting a hasty attack, “The attack helicopter battalion attacks to destroy, attrit, or disrupt.”⁸⁸ When tasked to overwatch a friendly ground maneuver force, the attack helicopter unit can suppress or neutralize an enemy force. The overwatch mission is designed to permit ground or air maneuver. Suppression is a common tactic used to accomplish the overwatch mission. “The effect of suppressive fires usually lasts only as long as fire continues.”⁸⁹

For an individual target, “Destruction occurs when the target is taken out of action permanently.”⁹⁰ When attacking targets comprised of multiple vehicles, personnel, and other equipment, rendering the unit ineffective with casualties or material

damage of 30 percent or more is normally considered destruction.⁹¹ An enemy force is considered attrited when 30 to 70 percent of its force is destroyed.⁹² "Neutralization tasks take a target out of the battle temporarily. ...a force is neutralized when ten percent of its equipment is damaged or ten percent of its personnel become casualties."⁹³ By interpolation, the disruption mission would account for the 10 to 30 percent destruction of an enemy force, or the temporary delay of a units ability to employ its command and control, maneuver, or fire support capabilities.⁹⁴

Gunnery (accuracy)⁹⁵

This section addresses aerial weapon system accuracy, and the impact that its converse, inaccuracy, has on the ground commander's risk assessment. The helicopter gunnery manual, FM 1-140, identifies four ballistic factors which affect the accuracy of weapons systems fired from aerial platforms. The four factors include: interior, exterior, aerial and terminal ballistics. In addition to ballistics, the helicopter gunnery manual addresses bore sighting, preflight checks, and other considerations which affect the accuracy of attack helicopter engagements. The helicopter gunnery manual ends with two chapters devoted to gunnery training, and gunnery range tables and operations. The helicopter gunnery manual unambiguously states, "Weapons systems on attack helicopters are only as effective as the aircrews (pilot and gunner) who operate them."⁹⁶ To account for the many factors affecting attack helicopter accuracy, this section assesses accuracy using a holistic approach. To account for the cumulative effects of ballistics, sighting, technique, and aircrew proficiency, this chapter assesses accuracy as a function of gunnery table standards.

The current army inventory of attack helicopters are equipped with three basic weapons types. The first type is a point target missile system used primarily against armor targets. The second is an area fire weapon used to place a variety of rocket delivered warheads, on lightly skinned vehicles and dismounts. The final weapon type, an area suppression gun, is found on most attack helicopters. It is used primarily for local security of the attack helicopter.⁹⁷ This section will focus on attack aviation's primary antipersonnel weapon, the 2.75 inch rocket. The point target missiles "will not normally be fired against dispersed enemy infantry forces."⁹⁸ The limited ammunition capacity of the nose-turret cannons, while useful for their intended local security task, are only marginally effective as a primary weapons system.⁹⁹

Aerial gunnery standards are measured against two criteria. The first is standards of engagement. The second is attaining the scoring criteria, as measured by target effect, for various weapons systems employed by the helicopter.¹⁰⁰ Standards of engagement are expressed as target arrays and weapons configurations tailored to distinctive unit missions. "Attack helicopter unit tables stress using TOW [tube-launched, optically tracked, wire guided] and Hellfire missiles against tanks and assorted armored targets. ...Cavalry unit tables stress hipshoot gunnery at assorted light armored targets and dismounted infantry. ...Light infantry division helicopter tables are designed for low- to mid-intensity conflict scenarios."¹⁰¹

Two modes of fire are used by attack aircraft, to engage dismounted forces. They are direct fire and indirect fire. "Direct fire is used to engage targets that are visible to the aircrew."¹⁰² Indirect engagements are used primarily against area targets not visible

to the aircrew. "Even if a pilot can see a target initially, he may no longer see it once he raises the nose of the aircraft to [engage it]." ¹⁰³ This case is also considered an indirect engagement. "When targets are engaged at comparable ranges, the beaten zone for indirect fire is initially larger than for direct fire." ¹⁰⁴ Two factors, dispersion and accuracy, "determine whether a particular weapon can hit an intended target." ¹⁰⁵ These accuracy standards and dispersion characteristics impact the risk assessment involved in how close a ground commander can safely employ attack aviation relative to friendly troops. When firing a set of rockets, "...points of impact will be scattered about the mean point of impact of the group of rounds. The degree of scatter of these rounds in range and deflection is called dispersion." ¹⁰⁶ The area affected by the bursting shells within a dispersion pattern is called the beaten zone. "Dispersion is caused by errors inherent in firing projectiles." ¹⁰⁷ Accuracy, as discussed earlier, is a function of the cumulative effects of many factors which determine where the dispersion pattern, or shot-group, lands relative to the target. The size of the beaten zone, or area affected by the volley of rockets, is a function of dispersion and warhead fragmentation.

The scoring criteria used to assess target effect, on those weapons systems commonly employed against dismounts, are particularly relevant to this monograph because they represent the accuracy standard that must be maintained by attack helicopter crews. The scoring criteria represents the Army's tolerance for inaccuracy, based on the cumulative effects of the factors producing that inaccuracy.

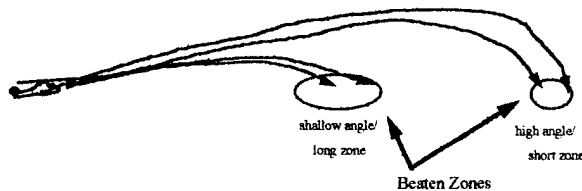
Appendix B, Weapons, Munitions, and Gunnery, highlights the elements of helicopter gunnery scoring criteria relevant to the attack helicopter, antipersonnel

mission. For the ground commander, calling for attack aviation supporting fires, the corollary to these score criteria numbers hold equal relevance. For every helicopter firing a full rocket pod (19 rockets) at an enemy 1000m away, 2 or 3 rockets would likely impact near friendly forces operating 150m from the attack pilots aiming point.¹⁰⁸ Because of its accuracy, the Apache firing its 30mm cannon could operate closer to friendly troops with an equivalent risk of fratricide. These numbers would increase if friendly forces were conducting direct fire engagements on more than one side of the enemy formation (non-linear battlefield), or if the attack helicopter engaged the enemy perpendicular to the front line trace (over-the-shoulder) of friendly troops.

This section discusses five attack profile combinations which affect attack helicopter rocket employment tactics and techniques in the target area. The five attack profiles are: direct vs. indirect engagement, hover vs. running fire, high vs. low attack angle, long vs. short engagements, and perpendicular vs. parallel engagements. The detailed discussion of the five attack profile options available, to the attack helicopter commander when conducting an antipersonnel mission, are important because they demonstrate helicopter gunnery techniques which should be accounted for in attack aviation tactical manuals.

Aviation gunnery

Rocket Dispersion Angle of Impact



Note: While the dispersion area of the beaten zone is a "tighter shot group" at longer ranges, the accuracy of the beaten zones location relative to the target is degraded.

FM 1-140, Figure 2-6, pg 2-7 (extract)

identifies three types of fire for attack helicopters: hover fire, running fire, and diving fire.

"Because the helicopter is less stable at a hover, the accuracy of some weapons systems is reduced."¹⁰⁹ "Forward speed

adds to the stability of the helicopter. This increases the accuracy of the weapons systems."¹¹⁰ "The beaten zones for hover and running fire are about the same at ranges of less than 3,000 meters."¹¹¹ The added stability, and comparable beaten zones at ranges less than 3,000 meters, render running fire the most accurate means of delivery of 2.75-inch rockets at nap-of-the-earth (NOE) altitudes. When firing rockets from NOE altitudes, especially at close range, "the beaten zone is extremely long and narrow."¹¹² This beaten zone pattern is a result of the shallow angle of impact made by the rockets at shorter ranges.

The final type of fire, diving fire, offers several advantages over hover or running fire at close range. Diving fire offers the stability advantages of running fire, and the increased angle of impact advantage hover fire attains at longer ranges. Other tactical advantages of diving fire include: decreased aircraft power requirements, allowing for increased combat loads and increased target acquisition and tracking capabilities, compared to hover fire at NOE altitudes. Finally, the attack helicopter is less vulnerable

to small arms fire during a diving fire attack, but is more vulnerable to air defense missiles if the enemy can engage with them.¹¹³

Regardless of which firing technique is employed, the attack helicopter publication on tactics and techniques recommends, "Attacks should be made along the length of the enemy force, not perpendicular to it."¹¹⁴ It goes on to say attacks should not be made directly over the heads of friendly formations. The rationale for this assertion is, shell casings expended by the aircraft fall on friendly troops and may cause confusion.¹¹⁵

Detection/acquisition systems

According to Captain Philip P. Taber, the "Positive identification of target locations and friendly positions not only is the most important task, but also the most difficult task on a fluid battlefield."¹¹⁶ This observation holds equal weight for attack aviation's antipersonnel missions in the close battle. This section considers the types of systems employed by attack helicopters to detect and acquire targets, and several limitations associated with these systems. It presents tactics and techniques, which air and ground units could use, to aid in the identification of friendly and enemy dismounts. This section is important for two reasons. First, an aircrew must find a target, and positively identify it, before engaging in close proximity to friendly troops. Second, the systems used by attack aviation to detect, acquire, and identify forces should impact on the tactics and techniques used by air and ground forces to enhance that capability. In general, there are three categories of systems used by aircrews to detect and acquire targets.

Each enhances the ability of the aircrew to employ their primary detection mechanism, pilot vision. The first category is composed of various optics which enhance the pilots vision through magnification. The second category involves image intensification to expand the range of light conditions in which the aircrew can detect objects. The final category uses infrared, and heat signatures to allow the aircrew to see through obscurants and darkness.¹¹⁷

The following techniques are compiled from the Philip D. Taber's article, and the Davis D. Tindoll's observations on techniques which have been used successfully at the Joint Readiness Training Center. With the exception of laser designation techniques, which can be found in the helicopter gunnery manual, the techniques described are not found in the basic aviation doctrine or techniques and procedures manuals.

For day operations, both Tindoll and Taber recommend marking both the enemy and friendly positions. When marking friendly positions, Taber recommends using redundant means. To mark enemy targets, Taber supports using artillery or mortar delivered white phosphorous or high-explosives to mark the target area.¹¹⁸ While this technique is effective, the ability to employ it would bring into question the need for using attack aviation in the supporting fire role. Tindoll suggests using smoke, tracer rounds, and prominent geographic terrain features to guide attack aviation to the target area.¹¹⁹

Whether conducting day or night operations, another means of differentiating between a friendly and enemy force is providing attack helicopter crews accurate grid locations of opposing forces. Exact friendly locations can be established using a global

positioning system receiver. Exact enemy locations could be confirmed using a helicopter FLIR, TIS, magnification optics, or laser designation. Laser designating is “by far the most accurate means of marking a target or friendly location...”¹²⁰ Using a laser offers another side benefit. An aircrew using an image intensification, night vision device, sees “both the designated target and the designator.”¹²¹ Taber suggests that the grid location method should never be used as the sole means of marking a friendly troop formation.

At night, ground-detonated flares are another excellent choice to mark targets. “Ground flares do not adversely affect night vision devices to the same degree as airborne flares.”¹²² Other methods which proffered as successful techniques include the employment of various light signals. Chemical lights, laser pointers, and narrow beam directional infrared or blue light filter flash lights have been employed by light infantry soldiers to mark friendly and enemy locations during recent Joint Readiness Training Center rotations.¹²³

Analysis

An analysis of the beaten zone dimensions and accuracy, as depicted in the gunnery table target criteria, indicate that attack aviation should engage an enemy force parallel to the friendly forces line of contact. This observation is reinforced by published attack helicopter tactics which recommend attacking along the length of an enemy formation¹²⁴, and avoiding frontal engagements of enemy ground forces¹²⁵. Whether engaging with a 20mm cannon, 30mm cannon, or 2.75-inch rocket, the width of the beaten zone is generally smaller than its depth at ranges under 1,500m.

Published aviation tactics and techniques have overlooked using the nose mounted cannon, for any purpose other than suppressive fire. The cannon provides local security to the helicopter, while the helicopter is employing its primary weapons. The doctrinal focus on rockets as the premier antipersonnel weapon system has limitations. The destructive force of the warhead, and the massing of those effects available in a 19 shot rocket pod are impressive. But in situations where friendly and enemy dismounted forces have closed to small arms weapons ranges, the nose cannon may be the weapon of choice. The helicopter gunnery scoring criteria indicates that a qualified Apache aircrew, engaging an enemy at 2000m, can place $\frac{2}{3}$ of its 30mm cannon rounds in a 100 X 300m box, around the pilots aiming point. Compared to a rocket engagement, this represents a reduced risk of fratricide when friendly and enemy forces have closed within small arms ranges.

Considering the AH-64's (Apache), superior acquisition and weapon system accuracy, army aviation should consider including more anti-personnel engagements in attack battalion gunnery tables. Army aviation should also consider capitalizing on the accuracy achieved by engaging dismounted targets with the 30mm cannon using the target acquisition and detection system (TADS), by considering it a primary weapon system when engaging dismounts. This is especially true of the attack helicopter battalions in light infantry divisions. Currently, gunnery table standards of engagement emphasize the use of cavalry units in the antipersonnel role, and they almost exclusively consider the cannon a local security suppressing weapon.

Direct fire engagements are the preferred mode of fire when engaging an enemy with rockets in close proximity to friendly forces. The larger beaten zone, inherent in an indirect fire engagement, results in a greater chance of fratricide than a direct fire engagement. The discussion of hovering, running, and diving type fire indicates that diving fire is the most accurate. It is also potentially the most dangerous to attack aviation, if the threat force is equipped with modern shoulder fired air defense weapons. An alternative to the firing techniques offered in the helicopter gunnery manual might be a hybrid that takes advantage of the best features of all three. This new firing technique would incorporate a nap-of-the-earth (NOE) approach to the target area, followed by a rapid pop-up climb and diving fire engagement. Such a technique would limit the attack helicopter's exposure to a missile threat, and gain the advantages of stability, accuracy, tighter dispersion, and terminal target tracking offered by diving fire.

Chapter 5: Conclusion

This paper examined the adequacy of aviation doctrine against three criteria. First, does Army aviation doctrine acknowledge the legitimacy of employing attack aviation, against a dismounted threat, in support of light infantry? Second, do official Army aviation publications specifically address employment tactics and techniques of attack aviation against enemy dismounts in close proximity to friendly troops? Finally, do attack aviation tactics and techniques adequately detail the coordination requirements of minimal planning, hasty attack missions in support of dismounted friendly forces in direct fire range of enemy dismounted forces.

Attack aviation doctrine acknowledges the legitimacy of employing attack aviation, against a dismounted threat, in support of a friendly light infantry force. FM 1-100 Doctrinal Principles for Army Aviation in Combat Operations, FM 1-111 Aviation Brigade, FM 1-112 Tactics, Techniques, and Procedures for the Attack Helicopter Battalion, FM 1-140 Helicopter Gunnery, and FM 17-95 Cavalry Operations, each specifically validates the practice of using attack aviation in the antipersonnel role.

Aviation doctrine's assertion that the tactics and techniques designed for mid- to high-intensity warfare attack operations are easily adapted to low-intensity conflict, when combined with doctrine's emphasis on mechanized warfare, is flawed. During a deep attack, planning considerations to engage a mechanized formation, material, or an enemy dismounted unit can pose similar challenges, and require similar control measures to effect mission execution. This is not the case during close operations. Employing attack aviation in an anti-armor hasty attack, in support of an armor direct fire engagement is challenging. Battlefield obstruction, rapid movement, and confused battle lines combine to increase the risk of fratricide. Vehicle identification (to include technical identify friend or foe means), weapons stand-off ranges, and communications availability combine to mitigate the challenges associated with introducing attack helicopters into the armor/mechanized close fight. Those mitigating factors do not exist in dismounted close battle.

For close operations the distances between friendly and enemy forces are often tied to the range of the direct fire weapons systems used. For this reason, the proximity of friendly and enemy forces in mechanized engagements is generally greater than in

dismounted engagements. Since the maximum effective range of the M-16 is only 300 meters, and direct fire engagements are often fought inside this maximum effective range, any supporting fire from a helicopter platform is a risky business. This proximity issue is further complicated by relative difficulties, between mechanized and dismounted engagements, of distinguishing friendly forces from enemy targets. When the complications of target identification, battlefield obstruction, weather, and degraded aircrew situational awareness are factored into the battle, the risk of fratricide when attack aviation is infused in a dismounted direct fire engagement will often be high.

Official Army aviation publications offer a limited number of specific employment tactics and techniques for engaging enemy dismounts in close proximity to friendly troops with attack helicopters. These employment suggestions are not consolidated, as deep attack helicopter operations are. The helicopter gunnery manual provides the most complete analysis of the techniques used to conduct antipersonnel missions. The tactical manuals provide limited reference to specific considerations for employing attack aviation in a hasty attack, against a dismounted enemy in close proximity to dismounted friendly troops. Aviation doctrine relies on the adaptability of attack aviation units to apply tactics designed for the mechanized close battle, to the dismounted fight.

Aviation doctrine exhibits a tendency to be rigid, because of its focus on the mid- to high-intensity battlefield. Aviation doctrine seems to be unduly restrictive when considering the combined doctrinal positions of: employing aviation in battalion strength or greater, and restricting the controlling ground commander's authority over OPCON

aviation. Attacking robust sets of mechanized targets with battalion or larger attack aviation formations attempts to doctrinally establish a risk assessment criteria for committing attack aviation forces. The doctrinal encouragement to attack moving formations supplements this doctrinal risk management technique, by selecting target sets that off set the limitations of attack aviation acquisition and weapons systems.

This dogmatic approach to tasking attack helicopters in battalion strength seems illogical when discussing dismounted low-intensity combat operations. The postulate of employing aviation in battalion strength should not carry the same dogmatic force as it does on a linear, mid- to high-intensity battlefield. Employing aviation in company strength may be sufficient combat power to assist a friendly dismounted unit to break contact with, or regain the initiative over, a small dismounted infantry force. The OPCON relationship, as amended by aviation's doctrinal restriction on the gaining unit commander, exhibits more similarity to a support relationship than a command relationship. If an attack aviation force can attack an assailable enemy flank, without maneuvering over enemy controlled terrain, a direct support relationship to the ground unit in contact may be more appropriate than the OPCON relationship recommended by doctrine. It may be time to reexamine the use of attack aviation as a fire support platform, in very limited, well defined scenarios. A study examining this issue would need to address: the history of the Army's authority to assign fire support missions to Army aviation¹²⁶, the requirement of attack aviation to maneuver as its primary means of survivability, and the adequacy of using fire support control measures and planning

techniques to integrate such a movement dependent force into the ground scheme of maneuver.

Presenting a brigade task force commander the option to task subordinate units of an OPCON aviation battalion might offer another method of achieving flexibility. In a LIC environment dominated by dispersed bands of dismounted enemy, there may be circumstances where assigning individual company missions for employment is warranted. If the aviation brigade or battalion establishes an area support system for combat service support, the attack company could rotate platoons or scout weapons teams between the forward area rearm/refuel point and the area of operations to sustain engagements in a predominantly dismounted LIC environment.

Attack aviation tactics and techniques do not adequately detail the coordination requirements of minimal planning, hasty attack missions in support of dismounted friendly forces in direct fire range of enemy dismounted forces. As an interim measure, light infantry units that employ this tactic on a regular basis, and the attack aviation units that support them, should develop detailed tactical standing operating procedures (TSOP) describing the coordination, tactics and techniques necessary to accomplish the mission. Detailed TSOPs, exercised during combined arms training, will ensure both the air and ground leaders responsible for committing attack aviation to the engagement understand the risks involved, and what actions must be taken to mitigate those risks.

Professionalism requires that the ground commander understand and assess the fratricide risk before employing attack helicopters in close proximity to friendly troops, and obligates the aviation commander to employ tactics and techniques which reduce

that risk when possible. The frequency with which attack aviation is asked to execute the antipersonnel mission in close proximity to light infantry forces, suggests that both air and ground doctrine should incorporate the science of employment technology to increase platform accuracy, and the art of their tactical employment to reduce mission risk and increase lethality.

In summary, aviation attack helicopter doctrine acknowledges the antipersonnel mission, and recognizes the importance of supporting light infantry in the close battle. Published tactics and techniques describing methods and requirements to employ attack aviation as a hasty attack force in support of a light infantry commanders scheme of maneuver, against a dismounted enemy in direct fire range, is limited. Considering the increased frequency with which attack aviation is called on to perform these missions, during JRTC training scenarios and actual LIC contingencies, professionals in both the aviation and light infantry communities should document and refine the employment techniques required to produce successful results.

Appendix A: Glossary

Attack helicopter. An attack helicopter is any helicopter which employs an air to surface weapon system which is controlled from the cockpit. In the current Army inventory this includes the: Apache, Cobra, OH-58D (Warrior), and the MH-6 (Little Bird).

Doctrine. “Fundamental principles by which the military forces or elements thereof guide their actions in support of national objectives. It is authoritative but requires judgment in application.”¹²⁷

Low Intensity Conflict (LIC). A LIC operation is a “Political-military confrontation between contending states or groups below conventional war and above the routine, peaceful competition among states. It frequently involves protracted struggles of competing principles and ideologies. Low intensity conflict ranges from subversion to the use of armed force. ...”¹²⁸ “The term low intensity conflict reflects an American perspective. Indeed, the term is a misnomer. To peoples more directly affected, the threat is immediate and vital.”¹²⁹

Operations Other Than War. “Military activities during peacetime and conflict that do not necessarily involve armed clashes between two organized forces.”¹³⁰

Peace-enforcement. “The application of military force, or the threat of its use, normally pursuant to international authorization, to compel compliance with resolutions or sanctions designed to maintain or restore peace and order.”¹³¹

Peacekeeping operations. “Military or paramilitary operations that are undertaken with the consent of all major belligerents; designed to monitor and facilitate

implementation of an existing truce and support diplomatic efforts to reach long-term political settlement.”¹³²

Tactics. “Tactics is the art and science of employing available means to win battles and engagements.”¹³³

Techniques. “Techniques are more specific instructions than general tactics and apply to operation of individual weapon systems and forces in particular functions.”¹³⁴

Appendix B: Weapons, Munitions (ordnance), and Gunnery

Two point target missiles are in common use in the Army inventory. They are the tube-launched, optically tracked, wire guided (TOW) and the Hellfire missiles. The AH-1S (Cobra) is equipped with the TOW, while the AH-64, OH-58D, and the MH-6 are generally equipped with the Hellfire. These point target missiles “will not normally be fired against dispersed enemy infantry forces.”¹³⁵ However, using them in the antipersonnel role is not without precedent in MOUNT operations or when attacking bunker complexes.

The area fire 2.75-inch rocket is designed as a light antipersonnel assault weapon.¹³⁶ Three categories of warhead are available for the 2.75-inch folding fin aerial rocket subsystem (FFAR) rocket for use in the antipersonnel mission. They are the 10 pound or 12 pound high explosive (HE), flechette, or a multipurpose submunitions (MPSM) warhead.¹³⁷ The HE warheads deliver a bursting radius similar to a small artillery shell. “They have programmable fuses that can point-detonate or be set to detonate between 700 and 8,800 meters.”¹³⁸ “Flechettes also have programmable fuses that can be set to detonate between 700 and 8,800 meters. They can be used for air-to-air combat or as suppression as an antipersonnel round.”¹³⁹ “The MPSM has nine bomblets in the warhead and operates on the ‘wall in space’ concept. ... the MPSM warhead deploys the bomblets at the laser range distance, allowing them to fall into the target area. The dual-purpose bomblets are effective against lightly armored vehicles and unprotected personnel.”¹⁴⁰ The Hydra-70 rocket, available to the Apache or OH-58D (Kiowa Warrior), can also carry a multi-purpose submunition with improved range,

reduced dispersion, and improved killing capacity against personnel, when compared to the standard 2.75-inch HE, flechette, or MPSM warheads.¹⁴¹

Gun Systems

- 7.62mm machine gun: capable of 6-second bursts at 2,000 to 4,000 rounds per minute. The ammunition drum stores 4,000 of linked ammunition. (AH-1)
- 20 mm cannon: 730+50 rounds per min. Ammo box and feed system is 750 rounds. (AH-1)
- 30 mm cannon: 600-650 rounds per minute. 1,200 round ammo box capacity. (AH-64)

FM 1-140, pg A-1

The Apache is equipped with a nose turret mounted 30mm cannon.

The AH-1S (Cobra) is configured with a nose turret mounted 20mm cannon.

Older models of the Cobra can also be configured with

a nose turret mounted 7.62mm machine gun. The Kiowa Warrior can be fitted with a wing pylon mounted machine gun. This machine gun can be a 7.62mm or .50cal configuration. There is limited ammunition capacity available to these weapons, because their primary function is providing the attack helicopter local security through suppressive fire.

Gunnery¹⁴²

Standards of Engagement

Range	Attack	Cavalry
< 1,999	2 of 3	4 of 5
2,000 - 2,999	5 of 6	4 of 5
>5,000	2 of 3	1 of 2

Note: Qualification is based on 9 successful engagements out of 12 targets at various distances. A successful engagement is determined by comparing desired effect on target from gunnery tables with the target effect criteria.

FM 1-140, Table 4-1

Aerial gunnery standards are measured against two criteria. The first is standards of engagement. The second is attaining the scoring criteria, as measured by target effect, for various weapons systems employed by the

helicopter.¹⁴³ Standards of engagement are expressed as target arrays, and the weapons configurations are tailored to distinctive unit missions.

The AH-1S, Cobra, uses the 2.75-inch Folding Fin Aerial Rocket Subsystem (FFARS) and the 20mm cannon or 7.62mm machine gun to engage dismounts. The AH-64, Apache, uses the 2.75-inch (FFARS) Rocket,

Scoring Criteria

Weapons system	Range	target effect
20 mm	up to 1,500	1/2 of rounds in 50mx100m target area
7.62 mm	up to 1,500	2/3 of rounds in 100mx200m target area
2.75-inch FAR	1,000 - 1,999	1/2 of rounds in 300mx700m target area
	2,000 - 2,999	1/2 of rounds in 300mx600m target area

FM 1-140, Table 4-2 (extract)

and the 30mm cannon weapon systems to engage dismounts. Currently, the helicopter gunnery manual does not incorporate the MH-6 (Littlebird), or Kiowa Warrior in its gunnery tables. Units structured around these weapons systems interpolate their gunnery tables based on unit mission and the fire control-weapon system capabilities of each helicopter.

Target effect, in these tables, establishes the minimum cumulative accuracy a helicopter crew is required to maintain. They represent the cumulative standards for placing accurate fires, from these area weapons systems, on an enemy. At the closest ranges, the Cobra aircrew, must place the majority of their 20mm cannon rounds in a target box 50m wide by 100m deep. Rocket fire is not even evaluated at ranges closer

than 1,000m. At that range the aircrew must place $\frac{2}{3}$ of their rockets in a target box 300m wide by 700m deep.

Scoring Criteria

Weapons svstem	Range	target effect
30 mm	IHADSS up to 1,999	2/3 rounds in 100mx200m/NA
	IHADSS 2,000 to 3,000	2/3 rounds in 100mx300m/NA
	TADS 1,500 to 2,499	2/3 rounds in 25mx175m/ 50mx100m
2.75-inch FARIHADS	1,000 to 1,999	1/2 rounds in 300mx700m/NA
	IHADSS 2,000 to 2,999	1/2 rounds in 300mx600m/NA
	TADS 2,000 to 2,999	1/2 rounds in 300mx600m/ 300mx500m

FM 1-140, Table 4-2 (extract)

The Apache accuracy figures are based, not only on the weapon system and range of the target, but also on the target acquisition system used to provide input to the fire control computer. When employing the 30mm cannon

at ranges up to 1,999m, using the integrated helmet and display sight system (IHADSS), the Apache crew must place $\frac{2}{3}$ of their rounds in a target box 100m wide by 200m deep. If they use the nose mounted, target acquisition and designator system (TADS), the target box shrinks to 25m wide by 175m deep.

For a 2.75-inch rocket engagement, the Apache crew must place $\frac{1}{2}$ of their rounds in a target box 300m wide by 700m deep, at a range of 1,000m, using the IHADSS. At an engagement at range of 2000m, using the TADS and a laser designator, the target box drops to 300m wide by 500m deep.

In each of the tables, aircrew training proficiency allows for between $\frac{1}{3}$ and $\frac{1}{2}$ of the ordinance to impact outside the target area box. Assuming even distribution of the missed shots around the target box, a ground commander fighting a linear-direct fire engagement, contiguous with one side of the target box, could expect between $\frac{1}{6}$ and $\frac{1}{8}$

of the rockets fired to fall on friendly forces. The actual number of rockets this equates to would depend on the number of helicopters participating in the engagement, and the number of rockets each helicopter fired.

Appendix C: Detection and Acquisition Systems

The telescopic sight unit (TSU) is the primary optical system employed by the Cobra. It is a stabilized telescopic sight with a two stage magnification capability. In the high power setting, the TSU offers 13 power magnification and 4.6 degrees field of view. In the low power setting, it offers 2 power magnification, and 28 degrees field of view. The light intensity of the target is diminished when viewed through the TSU¹⁴⁴ The Cobra has no thermal imaging system, and relies solely on the use of night vision goggles (NVG), an image intensification device, for night flying.¹⁴⁵ To acquire targets during darkness, the Cobra must use flares to illuminate the target area.¹⁴⁶

The Apache offers a wider range of detection and acquisition systems. Pilotage (navigation and flying tasks) is still primarily performed using the image intensification device. Once in the target area, the Apache aircrew can employ a direct vision optic (DVO), which is an optical telescope used primarily at short ranges "because of its limited magnification" and susceptibility to dust and smoke obscurants. The aircrew can also employ a day television (DTV) which offers high magnification, and can operate in the near-infrared range, which is "particularly useful in dust and smoke or in camouflaged areas."¹⁴⁷ Finally, the pilot can employ a target acquisition and detection forward looking infra-red system (TADS FLIR) which offers three true optical, and one electronic underscan fields of view.¹⁴⁸ Unlike the NVG, which intensifies visible light, the TADS FLIR "detects only thermal or heat sources..."¹⁴⁹

The Kiowa Warrior aircrews also uses NVGs as their primary means of pilotage. The aircraft is equipped with a mast mounted sight which offers many of the capabilities

found on in the Apache. The mast mounted sight integrates an optical sighting system, television sensor, thermal imaging sensor (similar to a FLIR), and laser rangefinder/designator.¹⁵⁰ These systems are fused with weapons system data and presented to the aircrew on a dashboard mounted multifunctional display. The specific characteristics of the MH-6 (Little bird) are not widely accessible, but one could assume their acquisition and detection system capabilities are comparable to the Kiowa Warrior.

Despite their sophistication, the detection and acquisition systems used on modern attack aircraft are still vulnerable to the effects of "...marginal weather and reduced visibility caused by battlefield obscurants...".¹⁵¹ Another limiting condition in the environment is darkness. As mentioned earlier, the Cobra is the attack helicopter most severely affected by night operations.

The Apache and the Kiowa Warrior also experience degradation at night. William H. Bryan and Michael A Albaneze, in an article titled "Apache Armed Reconnaissance Operations", talk about the difficulty Apaches were having detecting dug-in bunkers containing enemy soldiers, at night. They relate that, "Human body heat sources under the ground are difficult for the forward looking infrared [acquisition systems] to distinguish."¹⁵²

Another limitation of the infrared systems like the Apache FLIR or Warrior Target Information System (TIS), is caused by a phenomena known as infrared crossover. The greater the temperature difference between an object and its background, the better it can be seen by the FLIR or TIS. As targets heat up, or cool down, relative to their background, the temperature differential passes through a null. When the temperature

differential is too small for the infrared system's detection sensitivity, infrared crossover occurs. "Infrared crossover normally occurs around sunrise and sunset..."¹⁵³

Appendix D: Acronyms

ACR	Armored Cavalry Regiment
APC	Armored Personnel Carrier
ATKHB	Attack Helicopter Battalion
BCTP	Battle Command Training Program
CAS	Close Air Support
CAV	Division Cavalry Squadron
COL	Colonel
CPT	Captain
CSS	Combat Service Support
CTC	Combined Training Centers
DS	Direct Support
DTV	Day TeleVision
DVO	Direct Vision Optics
FFARS	Folding Fin aerial Rocket Subsystem
FLIR	Forward Looking InfraRed
HE	High Explosive
IHADSS	Integrated Helmet And Display Sight System
JRTC	Joint Readiness Training Center
LIC	Low-intensity Conflict
LTC	Lieutenant Colonel

mm	Millimeter
MOUNT	Military Operations in Urban Terrain
MPSM	MultiPurpose SubMunition
NMS	National Military Strategy
NOE	Nap-of-the-Earth
NVD	Night Vision Device
NVG	Night Vision Goggles
OC	Observer Controller
OOTW	Operations Other Than War
OPCON	Operational Control
SAMS	School of Advanced Military Studies
TADS	Target Acquisition and Detection System
TIS	Thermal Imaging System
TOW	Tube-launched, optically tracked, wire guided missile
TSU	Telescopic Sight Unit

End Notes

- ¹ Richard G. Davis, The 31 Initiatives (Washington, D.C.: Office of Air Force History, 1987), 21.
- ² Howard A. Wheeler, Attack Helicopters, (Baltimore, MD: The Nautical and Aviation Publishing Company of America, 1987): 60 - 64.
- ³ FM 1-112 dedicates an entire annex to the deep battle replete with a generic 'battle drill' standardized synchronization matrix.
- ⁴ This is especially true if the combat environment is a mid- to high- intensity, linear battlefield.
- ⁵ FM 1-112 Tactics, Techniques, and Procedures for the Attack Helicopter Battalion, (Washington, D.C.: Department of the Army, 21 February 1991), 1-1.
- ⁶ FM 1-100, A-1.
- ⁷ Ibid., 2-16.
- ⁸ FM 1-111, Aviation Brigade (Washington, D.C.: Department of the Army, 1990), 3-102.
- ⁹ FM 100-5, Operations (Washington, D.C.: Department of the Army, June 1993), 2-23.
- ¹⁰ FM 1-111, D-3.
- ¹¹ William Clinton, A National Security Strategy of Engagement and Enlargement, (Washington, D.C.: The White House, February 1995), 9. Two of the five tasks identified under the heading of Enhancement to our security include contributing to multilateral peacekeeping operations and supporting counter terrorism efforts and other national security objectives. These other objectives, for U.S. forces, include fighting drug trafficking, protecting U.S. citizens abroad, and providing training and humanitarian assistance to friendly governments.
- ¹² FM 100-23, Peace Operations, (Washington, D.C.: Department of the Army, December 1994), 42.
- ¹³ CTC Trends: Joint Readiness Training Center (JRTC), (Fort Leavenworth, KS: Center for Army Lessons Learned, 4QFY95 and 1QFY96), II-6.
- ¹⁴ Vijay Tiwathia, The Grenada War: Anatomy of a low intensity conflict, (New Delhi: Lancer International, 1987), 68.
- ¹⁵ Ibid., 74.
- ¹⁶ Thomas M. Donnelly, Margaret Roth, and Caleb Baker, Operation Just Cause: The Storming of Panama, (New York: Lexington books, 1991), 157 and 273.
- ¹⁷ Kent DeLong and Steven Tuckey Mogadishu! Heroism and Tragedy, (Westport, Connecticut: Praeger, 1994), 95. In one such incident, about 40 soldiers from a ranger regiment company were abandoned by an APC convoy of Pakistani and Malaysian soldiers dispatched to cover their withdrawal to Paki Stadium. At one point during the fight, the Ranger First Sergeant, David Mita, and another soldier who had earlier been wounded in the neck by a sniper, were trapped in an alley blocked by Somalis. The Cobra, seeing what had happened, "began laying circles of fire in the alley." With "brass casings from the bullet cartridges [coming]

down on us like rain," First Sergeant Mia and the wounded soldier escaped from the alley and linked-up with the convoy.

¹⁸ FM 100-5, 2-3.

¹⁹ FM 1-100, 2-15.

²⁰ Ibid.

²¹ This term is used extensively in the aviation community. It has gained broad recognition as evidenced by its use in several official publications including: an Aviation Digest article by Davis D. Tindoll (LTC) and Michael J. Negard (CPT), entitled "Air-Ground Coordination in the Hasty Attack", published in March/April 1995; and in a Center for Army Lessons Learned pamphlet entitled, CTC Trends: Joint Readiness Training Center (JRTC), 4QFY95 and 1QTRFY96.

²² FM 1-100, 2-15 and A-1.

²³ Ibid., 2-16. "During LIC, attack by aviation forces will mainly center on antipersonnel and aerial security operations." These are precisely the types of operations aviation units originally performed in Vietnam, and constitute the most likely types of employment of aviation at the lower spectrum of conflict, and rear operations in modern wars.

²⁴ FM 1-111, 3-9.

²⁵ FM 71-123 Tactics and Techniques for Combined Arms Heavy Forces: Armored Brigade, Battalion Task Force, and Company Team, (Washington, D.C.: Department of the Army, 1992), E-7.

²⁶ FM 1-111, Appendix J "Deep Operations".

²⁷ FM 1-112, 3-38/39.

²⁸ FM 7-20, The Infantry Battalion (Infantry, Airborne, and Air Assault), (Washington, D.C.: Department of the Army, 1984), 6-7.

²⁹ FM 1-111, 3-9.

³⁰ FM 1-112, 1-3.

³¹ FM 1-112, 1-3.

³² FM 1-112, 1-3.

³³ FM 1-111, 3-63.

³⁴ FM 1-100, 2-22.

³⁵ Ibid., 2-17.

³⁶ FM 1-111, 3-83.

³⁷ FM 1-100, 1-12.

³⁸ FM 1-111, D-2.

³⁹ FM 1-100, 2-17.

⁴⁰ FM 1-111, D-3.

⁴¹ Davis D. Tindoll and Michael J. Negard, "Air-Ground coordination in the Hasty Attack" Aviation Digest (Washington, D.C.: U.S. Government Printing Office, March/April 1995). This article starts out with a observation by the senior aviation controller, at the Joint National Training Center, Fort Polk, LA, describing the increased frequency of aviation's employment as a reaction force to provide combat power to dispersed cells of dismounted friendly troops.

⁴² FM 1-111, D-3.

⁴³ FM 100-5, 7-8.

⁴⁴ FM 1-112, 3-28.

⁴⁵ Davis D. Tindoll and Michael J. Negard, "Air-Ground coordination in the Hasty Attack" Aviation Digest (Washington, D.C.: U.S. Government Printing Office, March/April 1995), 34.

⁴⁶ FM 1-100, 3-2.

⁴⁷ FM 1-111, 3-63.

⁴⁸ FM 1-112, 3-37.

⁴⁹ The article by Davis D. Tindoll and Michael J. Negard, "Air-Ground coordination in the Hasty Attack" Aviation Digest (Washington, D.C.: U.S. Government Printing Office, March/April 1995), validate the trend at JRTC. During the SAMs BCTP exercise conducted from 21-25 March 1996, the issue of using aviation returning to the FARP from other missions to fly 'ad hoc' security routes in the rear area was championed by LTC Lockwood, the CSS OC. The OCs intent that this comment was intended to mean security (including engaging identified enemy) and not reconnaissance (simply reporting identified enemy) was clarified after the formal session. Operations URGENT FURY, JUST CAUSE, and RESTORE HOPE, contain examples of aviation "911 missions" which produced both positive and disastrous results in Granada, Panama, and Somalia respectively.

⁵⁰ FM 1-111, 3-74.

⁵¹ FM 1-111, 3-68.

⁵² FM 1-100, 1-10.

⁵³ Ibid., 1-2.

⁵⁴ FM 1-100, 1-1.

⁵⁵ Ibid., 3-2.

⁵⁶ FM 1-111, 3-6.

⁵⁷ FM 1-100, 1-15.

⁵⁸ Ibid., 2-2. This philosophy is repeated and further expanded in FM 1-111, 3-3.

⁵⁹ FM 1-100, 2-2.

⁶⁰ FM 1-111, 3-36.

⁶¹ FM 1-112, 1-3.

⁶² FM 101-5-1 Operational Terms and Symbols, (Washington, D.C.: Department of the Army, 1985), 1-52.

⁶³ Joint Pub 1-02, Department of Defense Dictionary of Military and Associated terms, (Washington, DC: Office of the Chairman of the Joint Chief of Staff, 23 March 1994), 274.

⁶⁴ FM 1-100, 2-3.

⁶⁵ FM 1-112, 1-1.

⁶⁶ FM 71-123, E-3 "It is important to remember that AHB's are maneuver units and not CAS or FS units. Therefore, they must be integrated into the commander's tactical plan along with the other maneuver units." The thing that strikes me about this statement is that the AHB, must be integrated into the commander's scheme of maneuver, whether it is considered a maneuver force or a FS force. Therefore, the only critical distinction becomes the relationship (OPCON or DS) between the AHB and the ground maneuver force it is supporting.

⁶⁷ While it doesn't provide the OPCON doctrinal restrictions as the proximate cause of the coordination echelons, the Tindoll article talks to these groupings throughout.

⁶⁸ Tindoll, 35.

⁶⁹ Ibid., 35, Figure 1.

⁷⁰ Ibid., 35.

⁷¹ FM 71-123, 3-86.

⁷² FM 1-111, 3-74.

⁷³ Tindoll, 35, Figure 2.

⁷⁴ Philip P. Taber, "Night CAS on the Conventional Battlefield," Army Aviation Digest, (Washington, D.C.: U.S. Government Printing Office, September/October 1994), 19.

⁷⁵ Air Force Instruction 13-106, Air Support Operations and Tactical Air Control Parties, (Washington, D.C.: Department of the Air Force, 21 July 1994), 2.3.1 and 2.3.4.

⁷⁶ Tindoll, 36. Italics is added by the author, to add emphasis to this often overlooked yet important point. It does not appear in the original article.

⁷⁷ Ibid., 39.

⁷⁸ Ibid., 37.

⁷⁹ Ibid.

⁸⁰ John, Magness [CPT], "Army Aviation in Level III Rear Operations" U.S. Army Aviation Digest (Washington, D.C.: Government Printing Office, September/October 1992), 35.

⁸¹ FM 1-112, 3-40.

⁸² Tindoll, 34.

⁸³ Ibid., 34.

⁸⁴ FM 1-100, 3-4.

⁸⁵ FM 1-111, 3-71.

⁸⁶ FM 1-112, 2-12.

⁸⁷ Taber, 20.

⁸⁸ FM 1-112, 2-8.

⁸⁹ FM 1-140, 4-15.

⁹⁰ Ibid., 4-15.

⁹¹ FM 1-112, 2-8 and FM 1-140, 4-15.

⁹² FM 1-112, 2-8.

⁹³ FM 1-140, 4-15

⁹⁴ FM 1-112, 2-8. The interpolation of the individual target destruction percentage is a function of the comparison of the gunnery definition of neutralize with the attack helicopter battalion TTP manuals description of destroy, attrit, and disrupt. The author interprets the term delay, used to quantify disrupt in Fm 1-112, the same as the temporary effect characteristic, used to quantify the condition of neutralize in the gunnery manual.

⁹⁵ Unless otherwise specified, this section is compiled from chapters 1 and 4 of FM 1-140 Helicopter Gunnery. Specific accuracy figures, target types, and ranges for various aircraft and weapons systems are derived from tables 4-1 thru 4-21. The final paragraphs of the section are interpolation of risk to friendly troops, extrapolated from the figures presented in the manual.

⁹⁶ FM 1-140, 3-1.

⁹⁷ For a more detailed examination of the weapons systems available on modern US Army attack aviation helicopters, refer to appendix B.

⁹⁸ Tindoll, 36.

⁹⁹ Because of there limited application to the doctrinal antipersonnel mission, discussion of the missile systems and nose-turret cannons are contained in appendix B.

¹⁰⁰ FM 1-140, 4-15.

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- ¹⁰¹ Ibid., 4-14.
- ¹⁰² Ibid., 3-3.
- ¹⁰³ Ibid., 3-3.
- ¹⁰⁴ Ibid., D-9.
- ¹⁰⁵ Ibid., 2-7.
- ¹⁰⁶ Ibid.
- ¹⁰⁷ Ibid.
- ¹⁰⁸ For more detail on how this assertion was arrived at, see appendix B's section on gunnery.
- ¹⁰⁹ FM 1-140, 3-3.
- ¹¹⁰ Ibid., 3-3.
- ¹¹¹ Ibid., D-9.
- ¹¹² Ibid.
- ¹¹³ Ibid., 3-3.
- ¹¹⁴ FM 1-112, 3-22.
- ¹¹⁵ FM 1-112, 3-22.
- ¹¹⁶ Philip P. Taber, "Night CAS on the Conventional Battlefield" Aviation Digest (Washington, D.C.: U.S. Government Printing Office, September/October 1994), 18.
- ¹¹⁷ Appendix C, Acquisition and Detection Systems, describes in more detail the capabilities and limitations of acquisition and detection systems available on attack helicopters in the current Army inventory.
- ¹¹⁸ Taber, 19.
- ¹¹⁹ Tindoll, 39.
- ¹²⁰ Taber, 19.
- ¹²¹ Taber, 19.
- ¹²² Ibid, 19.
- ¹²³ Tindoll, 38.
- ¹²⁴ FM 1-112, 3-22.
- ¹²⁵ FM 1-100, 3-3.

¹²⁶ Richard G. Davis, 13-23. This staff study provides an excellent summary of the history of the Army armed helicopter missions issue. It starts with Secretary of Defense Charles E. Wilson's memorandum of November 26, 1956, to President Wilson defining the missions and types of aircraft assigned to Army aviation. It progresses through President Wilson's March 18, 1967, DOD Directive 5160.22, the Howze Boards final report published on August 20, 1962, and finally Secretary of state McNamara's September 11, 1965 memorandum to Secretary of the Air Force, Eugene M. Zuckert, authorizing production helicopters armed to contribute to the success of operations. The 1995 roles and missions commission also looked at the delineation of close air support responsibilities between the Army and Air Force.

¹²⁷ Joint Publication 1-02, 120.

¹²⁸ Joint Pub 1-02, 222.

¹²⁹ FM 100-20, Military Operations in Low Intensity Conflict, (Washington, D.C.: Department of the Army, December 1990), iv.

¹³⁰ FM 100-23, 111.

¹³¹ Ibid.

¹³² Ibid., 112.

¹³³ FM 100-5, 6-3.

¹³⁴ James J. Tritten, "What is this doctrine stuff?" Proceedings (Annapolis, MD: U.S. Naval Institute, vol. 121/1/1,3, January, 1995), 77.

¹³⁵ Tindoll, 36.

¹³⁶ FM 1-140, A-1.

¹³⁷ Ibid.

¹³⁸ FM 1-112, J-13.

¹³⁹ Ibid.

¹⁴⁰ Ibid.

¹⁴¹ FM 1-140, A-1.

¹⁴² Unless otherwise noted the material in this section is attributed to FM 1-140 Helicopter Gunnery.

¹⁴³ FM 1-140, 4-15.

¹⁴⁴ Ibid., D-3.

¹⁴⁵ Tindoll, 37.

¹⁴⁶ FM 1-140, D-3.

¹⁴⁷ Ibid., I-25.

¹⁴⁸ Ibid., I-2 thru I-5.

¹⁴⁹ Tindoll, 37.

¹⁵⁰ Myron Michael Kawa and Jack M. VanKirk Program and Operational Highlights of the Armed OH-58D Kiowa Warrior (Washington, D.C.: American Helicopter Society, May 1990), B11 thru B13.

¹⁵¹ FM 1-100, 1-15.

¹⁵² William H. Bryan and Michael A. Albaneze, "Apache Armed Reconnaissance Operations", Aviation Digest, (Washington, D.C.: Government Printing Office, January/February 1992), 41.

¹⁵³ FM 1-112, J-9.

Bibliography

Books:

- Adkin, Mark. Urgent Fury: The Battle for Grenada. Lexington, Massachusetts: Lexington Books, 1989.
- Cheng, Christopher C. S. Air mobility: the development of a doctrine. Westport, Connecticut: Praeger, 1994.
- DeLong, Kent and Tuckey, Steven. Mogadishu! Heroism and Tragedy. Westport, Connecticut: Praeger, 1994.
- Donnelly, Thomas M., Roth, Margaret, and Baker, Caleb. Operation Just Cause: the storming of Panama. New York: Lexington Books, an imprint of Macmillan, Inc., 1991.
- Dow, Richard B. Fundamentals of Advanced Missiles. New York: Wiley, 1958.
- Leverett, Davis and Follin, James W. Exterior Ballistics of Rockets. Princeton, NJ: Van Nostrand, 1958.
- McLean, Brian W. Joint Training for Night Air Warfare. Maxwell Air Force Base, AL: Air University Press, 1992.
- Swain, Richard M. "Lucky War": Third Army in Desert Storm. Fort Leavenworth, KS: U.S. Army Command and General Staff College Press, 1994.
- Tiwathia, Vijay. The Granada War: anatomy of a low intensity conflict. New Delhi: Lancer International, 1987.
- Wheeler, Howard A. Attack Helicopters, (Baltimore, MD: The Nautical and Aviation Publishing Company of America, 1987.

Monographs:

- Fails, William R. Marines and Helicopters, 1962-1973. Washington, D.C.: History and Museums Division, Headquarters, U.S. Marine Corps, 1978.
- Shrader, Charles R. (LTC). Amicide: The Problem of Friendly Fire in Modern War, Research Survey No. 1. Fort Leavenworth, KS: Combat Studies Institute, December 1982.

Articles/Journals/Pamphlets:

Allen, Matthew. "Military helicopter doctrines of the major powers, 1945-1992: making decisions about air-land warfare," Contributions in military studies no. 137. Westport, Conn.: Greenwood, 1993.

Boyce, Joseph Canon. "New weapons for air warfare: fire-control equipment, proximity fuses, and guided missiles," Science in World War II. Boston: Little, Brown, 1947.

Bryan, William H. and Albaneze, Michael A. "Apache Armed Reconnaissance Operations," Army Aviation Digest. Washington, D.C.: Government Printing Office, January/February 1992.

Clinton, William. A National Security Strategy of Engagement and Enlargement. Washington, D.C.: The White House, February 1995.

CTC Trends: Joint Readiness Training Center (JRTC). Fort Leavenworth, KS: Center for Army Lessons Learned, 4 QTR 95 and 1 QTR 96.

Davis, Richard G. The 31 initiatives: a study in Air Force-Army cooperation. Washington D.C.: Office of Air Force History, U.S. Air Force, 1987.

"Elementary Optics and Applications to Fire Control Instruments," War Department Document no. 1065. Washington D.C.: Government Printing Office, 1992.

Magness, John (CPT). "Army Aviation in Level III Rear Operations" Army Aviation Digest. Washington D.C.: Government Printing Office, September/October 1992.

McMichael, Scott R. "A Historical Perspective on Light Infantry," CSI Research Survey #6. Fort Leavenworth, KS: U.S. Army Command and General Staff College, September 1987.

Myron, Jichaek Kawa and VanKirk, Jack M. Program and Operational Highlights of the Armed OH-58D Kiowa Warrior. Washington, D.C.: American Helicopter Society, May 1990.

Stiener, Richard C. "Operation Desert Storm: investigation of a U.S. Army fratricide incident: statement of Richard C. Stiener, Director, Office of Special Investigations," Washington, D.C.: General Accounting Office, 1995.

Taber, Philip P. (CPT). "Night CAS on the Conventional Battlefield," Army Aviation Digest. Washington, D.C.: U.S. Government Printing Office, September/October 1994.

Tindoll, Davis D. (LTC) and Negard, Michael J. (CPT). "Air-Ground Coordination in the Hasty Attack," Army Aviation Digest. Washington, D.C.: U.S. Government Printing Office, March/April 1995.

Tritten, James J. "What is this doctrine stuff?" Proceedings. Annapolis, MD: U.S. Naval Institute, January 1995.

Field Manuals:

Air Force Instruction 13-106, Air Support Operations and Tactical Air Control Parties. Washington, D.C.: Department of the Air Force, July 1994.

FM 1-100 Doctrinal Principles for Army Aviation in Combat Operations. Washington, D.C.: Department of the Army, 1989.

FM 1-111 Aviation Brigades. Washington, D.C.: Department of the Army, 1990.

FM 1-112 Tactics, Techniques, and Procedures for the Attack Helicopter Battalion. Washington, D.C.: Department of the Army, 1991.

FM 1-116 Tactics, Techniques, and Procedures for the Air Cavalry/Reconnaissance Troop. Washington, D.C.: February 1991.

FM 1-140 Helicopter Gunnery. Washington, D.C.: Department of the Army, 1986.

FM 7-20 The Infantry Battalion (Infantry, Airborne, and Air Assault). Washington, D.C.: Department of the Army, 1984.

FM 7-72 Light Infantry Battalion. Washington, D.C.: Department of the Army, March 1987.

FM 17-95 Cavalry Operations. Washington, D.C.: Department of the Army, September 1991.

FM 71-123 Tactics and Techniques for Combined Arms Heavy Forces: Armored Brigade, Battalion Task Force, and Company Team. Washington, D.C.: Department of the Army, 1992.

FM 100-5 Operations. Washington, D.C.: Department of the Army, June 1993.

FM 100-20 Military Operations in Low Intensity Conflict. Washington, D.C.: Department of the Army, December 1990.

FM 100-23 Peace Operations. Washington, D.C.: Department of the Army, 1994.

FM 101-5-1 Operational Terms and Symbols. Washington, D.C.: Department of the Army, 1985.

Joint Pub 1-02 Department of Defense Dictionary of Military and Associated Terms. Washington, D.C.: Department of Defense, March 1994.